Osmium Data Recorder (DaRe)

User Manual

Revision 1.8

Registered Office:
GT Silicon Pvt Ltd
LIG – 1398, Avas Vikas – 3
P.O. – NSI, Kalyanpur,
Kanpur (UP), India, PIN – 208017

R&D Centre:
GT Silicon Pvt Ltd
S6, SIDBI Innovation & Incubation
Centre, IIT Kanpur
Kanpur (UP), India, PIN – 208016

Tel: +91 512 259 5333
Fax: +91 512 259 6177
Email: info@gt-silicon.com
URL: www.gt-silicon.com

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Revision History

Revision	Revision Date	Updates
1.0	22 May 2014	Initial Release of User Manual
1.1	20 July 2014	Modified for Quick Guide for Demo
1.2	30 Aug 2014	Included link to demo video Modified for accumulated and average speed
1.3		Left intentionally
1.4	04 Sep 2014	Modified o/p data description to avoid ambiguity
1.5	15 Sep 2014	Updated video link
1.6	16 Sep 2014	Included suggestion on the placement of MIMU22BT
1.7	03 Jan 2015	Included illustration in “A Quick Guide to Demo” section
1.7a	06 Jan 2015	Modified axis information in “General Notes”. Included illustration.
1.8	15 May 2015	Updated for DaRe 1.5 Removed “Pause” tab from DaRe. Removed avg speed from DaRe.

Hardware and OS Requirement

This application is designed for min API level 6, i.e. Android 2.0.1 and is targeted at API level 19 i.e. Android 4.4 which is the latest version of Android available at this moment of time.

Android device must have SD card in it. Output data files are stored in SD card, and are of few KBs.

Purpose & Scope

The DaRe Application for Android, enables transfer of location data from Osmium MIMU22BT, over BlueTooth, to the Android device (Smartphone, Tab etc) having this application. DaRe collects data from MIMU22BT and processes it to produce following:

(i) the Dead reckoning data – x (m), y (m) and z (m) coordinates of MIMU22BT,

(ii) time stamp (sec) (time is reset to 0s with Start button pressed.),

(iii) distance covered by the wearer (m) after pressing Start button and

The recorded data is in tabular form and can be processed using spreadsheet.

DaRe Installation Procedure

1. Transfer DaRe.apk to either SD card or Phone/Tab memory.
2. Click on Dare.apk to install
3. Allow it for (i) Storage access, (ii) Network communication for BlueTooth and (iii) System Tools for BlueTooth settings) by clicking on “Install”
4. Choose Done (if you intend to use it later) / Open (if you intend to use it now)

Description

MIMU22BT can be connected with DaRe, once paired with the Android device, with the help of optional menu provided in the application, which is further able to scan the available devices. DaRe is equipped with three buttons i.e. ‘Start’ and ‘Stop’ buttons, a text field and a screen displaying the data sent to and read from MIMU22BT. Once DaRe is connected with MIMU22BT, these buttons would be activated.

1. The Text Field provided, gives the usability to the user to add some note regarding the experiment if he/she wishes to. The note should be added before the ‘Start’ button is pressed

2. Start: - As soon as this button is pressed DaRe sends the command to MIMU22BT for resetting Dead reckoning system and resets all the variables of processing the data. Along with this it also creates two files, one for recording the data and the other having the experiment related log, named after date and time of creation, and are stored in the directory named MIMUBT in the SD card of the Android device. MIMU22BT begins communicating Dead reckoning data after pressing Start button.

3. Stop: - With this button being clicked, DaRe sends the command to MIMU22BT to stop processing the data and to stop all the outputs to be sent by MIMU22BT. It also closes all the open files.

4. The display shows the data received and the data sent to the device in a form of chat.

The created text files on the SD card under the directory named 'MIMUBT': -

1. Data file: - This file contains the data received i.e. the x, y and z coordinates with the time elapsed, cumulative distance covered by the wearer and the average speed since the pressing of Start button. The data is stored in the format 'x' 'y' 'z' 'relative time''distance covered' 'average speed'. This file is named with the current date and time in the format 'yyyy-MM-dd-HHmmss'. The coordinate system, time and distance covered are initialized on pressing Start button, i.e. (x,y,z), t and distance are (0m,0m,0m), 0s and 0m respectively in the beginning.

2. Log file: - This file contains (i) version of the application DaRe, (ii) version of the Android device on which it is being run, (iii) remark/note, if any, added by the user. (iv) date and time at which the experiment is started, (v) the pause and un-pause time of experiment if any and (vi) the date and time at which the experiment is stopped. This file is named with the current date and time with '_log' appended to it, in the format 'yyyy-MM-dd-HHmmss_log'.

How To Use

Figures 1 to 8 describe steps to collect Dead reckoning data from MIMU22BT using DaRe:

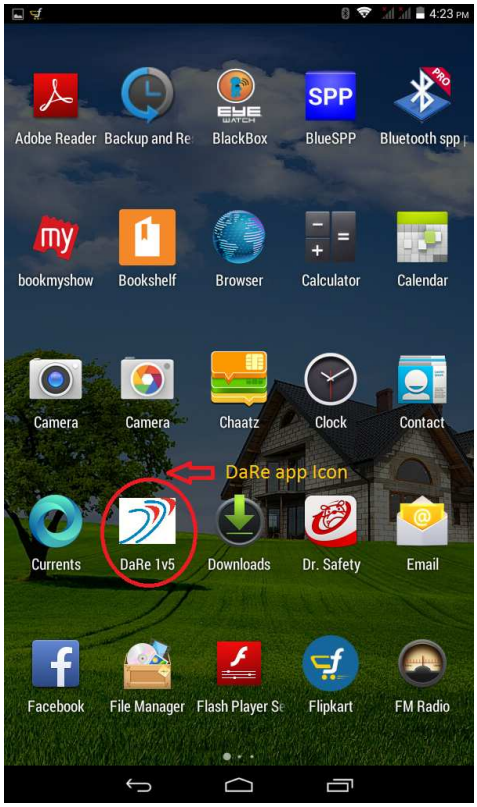


Figure 1: Click on DaRe's icon

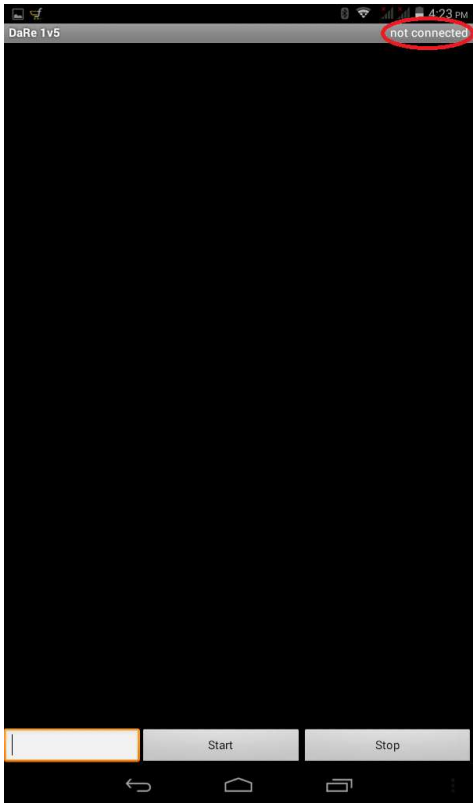


Figure 2: DaRe application when not connected to MIMU22BT

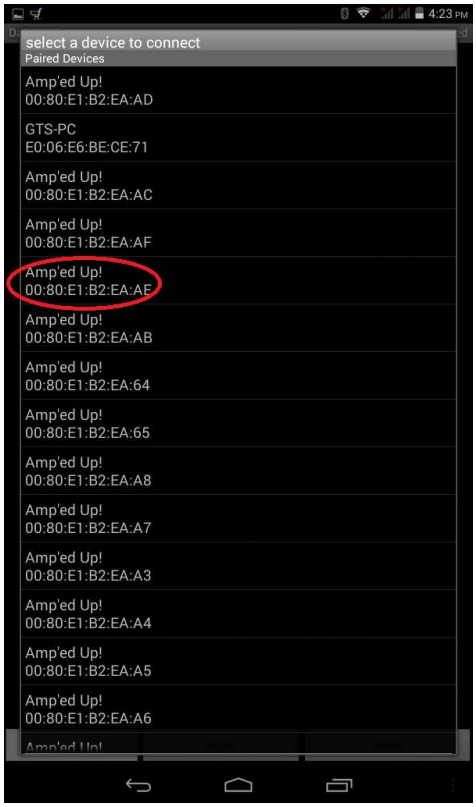


Figure 3: Select MIMU22BT to connect, as highlighted in the image.

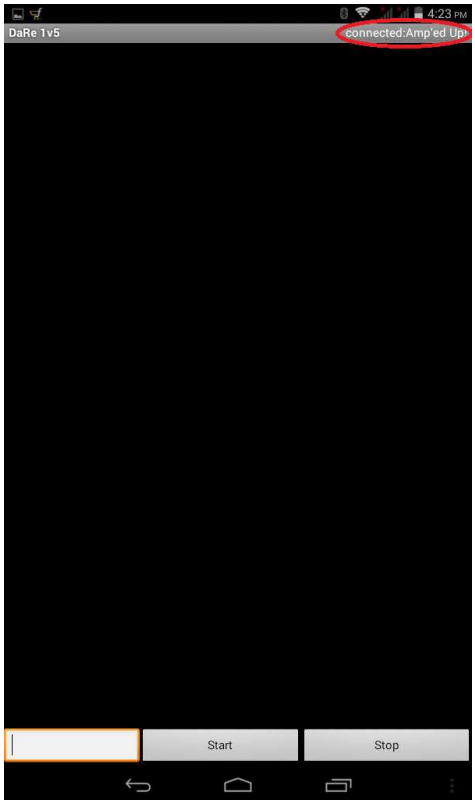


Figure 4: DaRe connected with MIMU22BT !

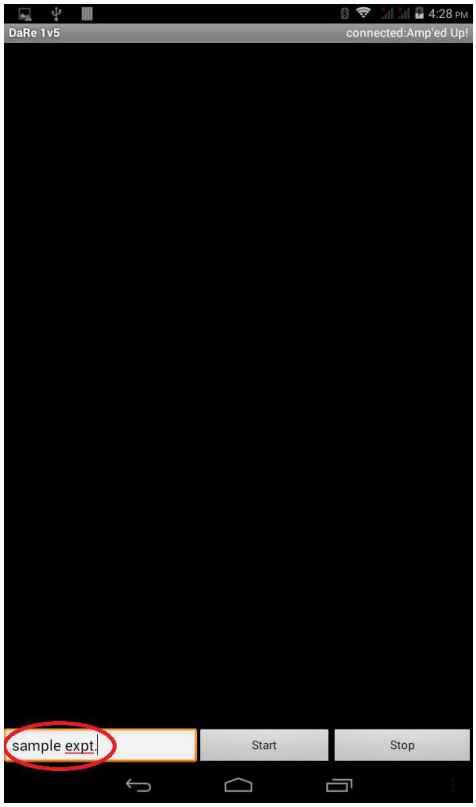


Figure 5: Enter name of the experiment. (Optional). And press 'Start' button.

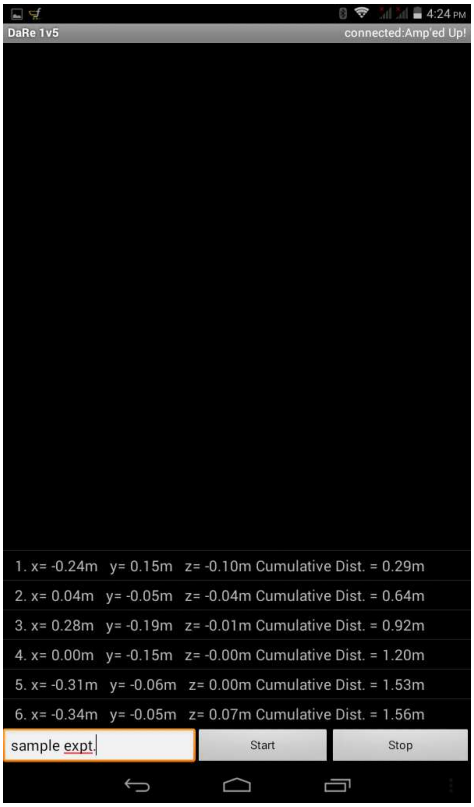

4:24 PM
DaRe 1v5
connected:Amp'ed Up!
1. x= -0.24m y= 0.15m z= -0.10m Cumulative Dist. = 0.29m
2. x= 0.04m y= -0.05m z= -0.04m Cumulative Dist. = 0.64m
3. x= 0.28m y= -0.19m z= -0.01m Cumulative Dist. = 0.92m
4. x= 0.00m y= -0.15m z= -0.00m Cumulative Dist. = 1.20m
5. x= -0.31m y= -0.06m z= 0.00m Cumulative Dist. = 1.53m
6. x= -0.34m y= -0.05m z= 0.07m Cumulative Dist. = 1.56m
sample expt
Start
Stop

Figure 6: DaRe communicating with MIMU22BT !

Figure 7: Sample log file in /sdcard/MIMUBT directory.

Figure 8: Sample Dead reckoning data file in /sdcard/MIMUBT directory.

Live Video Demonstration & Quick Bring-up Guide

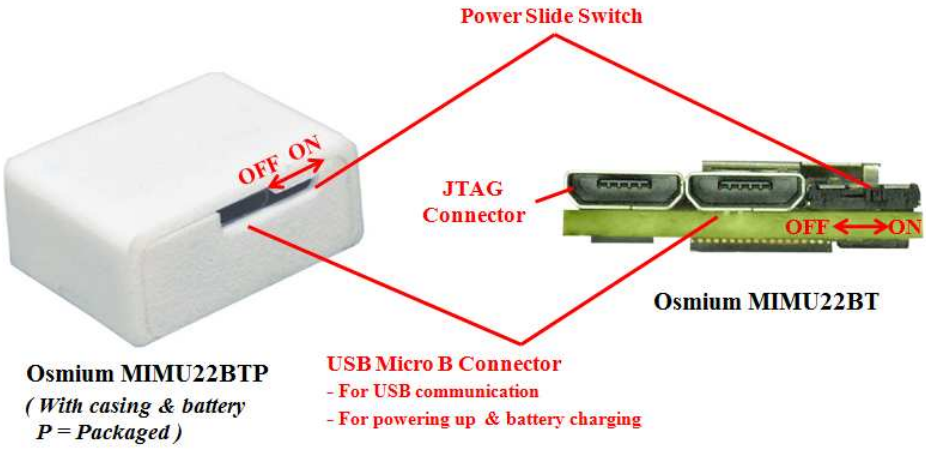
Watch the videos on mounting schemes and to bring up Osmium MIMU22BTP using DaRe:

https://www.youtube.com/watch?v=BLcElh0rKXI

https://www.youtube.com/watch?v=U9e_tgMOLmo

Don’t forget to leave your feedback comment !

A Quick Guide to Demo



1. Power ON the Osmium MIMU22BT by sliding the switch towards right.
2. Mount MIMU22BT on shoe heel vertically or place it on top of forefront and stick it firmly using tape, as shown in the images below:

Figure 11: MIMU22BT attached to shoe heel

Figure 12: MIMU22BT on toes (preferred)

3. Scan for BlueTooth devices in your Android Phone/Tab. And pair phone with MIMU22BT (Amp'ed Up!)
4. Click open DaRe. Connect it with MIMU22BT.
5. DaRe is ready to collect data on getting connected with MIMU22BT.
6. Press Start button to begin data recording.
7. You may walk as you desire.
8. Press Stop button to end data recording.
9. Transfer data file (/sdcard/MIMUBT/*.txt) generated by DaRe, to your PC / laptop. You may either use BlueTooth or USB to transfer this file.

10. Open data file on spreadsheet for detailed analysis.

General Notes

- *Fully drained out battery takes approximately 2 hours of charging.*
- *Charge MIMU22BT, using USB cable, for 4 hours before using for the first time.*
- *Power OFF MIMU22BT (slide switch towards left), when not in use.*
- *With 150mAH Li-ion battery, MIMU22BT has approximately 1.5 hours of one charge cycle.*
- *DaRe must be closed / exit after pressing Stop button. Initiating new experiment in continuation to a previous one, without closing DaRe between Stop (for previous experiment) and Start (for new experiment), does not give expected results.*
- *If DaRe is closing on its own or unable to connect to MIMU22BT or displaying x,y,z data on screen, then it is time to recharge MIMU22BT.*
- *It is somewhat tricky to align the axis (x or y along the movement) if you want to attach the device from outside the shoe. It can possibly be achieved after few trials. If the device is placed (with connector facing front) on toes as in Fig 12, the wearer would start walking along negative y-axis. The positive x-axis would be on the right hand side of the wearer. Axis alignment can better be achieved by placing MIMU22BT inside shoe heel with good precision.*